



PART A – Introduction and Description

GUIDELINES FOR AN

ENVIRONMENTAL IMPACT STATEMENT

ON THE PROPOSED ALCAN GOVE ALUMINA REFINERY

THIRD STAGE EXPANSION

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These Guidelines have been developed to assist Alcan Gove Pty Limited in preparing a draft Environmental Impact Statement (EIS) for the Alcan Gove Alumina Refinery Third Stage Expansion in accordance with Clause 8 of the Administrative Procedures of the *Environmental Assessment Act (1982)* of the Northern Territory

The final guidelines will consist of 3 sections. Part A (this section) is the introduction and description of the project and the EIS process. Part B (attached) details, in a generic fashion, all the issues that require addressing by the proponent. Part C (to be attached as part of the final guidelines) will contain additional project specific issues and concerns raised during the public consultation period on the guidelines.

1 Project Description

The proponent for this project is Alcan Gove Pty Limited a wholly owned subsidiary of Alcan Inc (Alcan).

The operations are located on the Gove Peninsula in the north-east of Arnhem Land in the Northern Territory. They consist of a bauxite mine and a refinery which converts the bauxite into alumina. The alumina from Gove is exported from the refinery to aluminium smelters around the world. The operations currently employ 1,100 people who live in Nhulunbuy, a town with a population of 4,000.

Proposed Expansion

The refinery's expansion project will increase total production of alumina from 2.0 mt/a to 3.5 mt/a. Alcan's objective for the expansion is to sustain its internationally competitive alumina position and have a positive impact on environment performance.

All new plant and equipment to be installed as part of the expansion will be located within the footprint of the existing operations. There is no requirement to use any land outside the existing lease areas.

While the existing mining rate will increase, no significant change in mine plan is required to extract the increased tonnage. The crushing facility at the mine site will be modified to improve availability and capacity. The speed of the conveyor from the mine to the refinery will also increase.

Increased refinery production will be achieved by installing new process equipment which will integrate into the existing refinery process. As well as the new process equipment, an additional power station boiler to supply steam and electricity will be installed. Consideration is also being given to the installation of a liquor purification process designed to reduce the organic impurities in the residue to enable maximum recycling of caustic liquor. This will only be implemented if all appropriate environmental and health guidelines can be met.

The alkaline residue from the refinery is currently disposed of in containment ponds at the residue disposal area. Plans are currently being developed to neutralise some of the alkaline waste water and red mud before disposing of it in the containment ponds. The waste water from the neutralisation process will be saline but suitable for discharge to the marine environment. In this way the inventory of water stored in the residue disposal area can be progressively reduced and the quality of the marine discharge will be improved.

Because of the increased rate of mud disposal required as a result of the expansion, the capacity of the existing disposal facility is expected to be reached by about 2015. Prior to that time, detailed studies into future residue disposal and drainage discharge options will be undertaken and a separate government approval will be sought for any new disposal area.

The expansion design will incorporate sufficient flexibility for the refinery to burn either fuel oil or natural gas. Negotiations are currently under way to secure natural gas supply to the plant. Fuel oil will continue to be burned until natural gas becomes available, with appropriate controls to achieve acceptable air quality.

The expansion will increase the refinery's demand for water. Demand management will be implemented with the aim of remaining within the supply capacity and licence limits of the existing borefield. If demand management alone cannot ensure adequate water supply, other options will be identified.

The construction phase will extend for 33 months. At its peak there will be an estimated 1,220 construction workers. These workers will be accommodated in a self-servicing construction camp to be developed in Nhulunbuy South. Changes to the operational workforce will be determined during the design phase.

Effects of the Expansion

The environmental effects of the expansion project have yet to be studied fully and Alcan will produce a detailed assessment of all relevant aspects in the environmental assessment report. This report will be in the form of an Environmental Impact Statement prepared in accordance with the requirements of the Northern Territory Government.

Even though the studies are not yet complete, it is possible to identify positive benefits to the environment from the expansion. These include:

- Installation of the Alcan double digestion process will ensure the optimum amount of alumina is extracted from the bauxite and that lower grade bauxite can be processed. This will result in a 10% improvement in alumina extraction per tonne of bauxite mined and, as a result, an extension of the mine life.
- The improved digestion will also result in a 25% reduction in residue produced per tonne of product.
- With liquor purification there will be 25% less caustic consumption and a 75% reduction in soluble caustic waste per tonne of alumina produced.
- There will be a 5% reduction in energy consumption and a reduction in greenhouse gas emissions per tonne of product
- Once the natural gas supply becomes available, there will be a substantial reduction in sulphur dioxide emissions and combustion particulates as well as a further reduction in greenhouse gas emissions. Appropriate control measures will be taken to ensure acceptable air quality is achieved if the supply of natural gas is delayed.
- There will be no significant increase in ship movements after completion of construction.

Table 1 summarises the main components of the existing refinery and how they will be affected by the expansion project. The significant environmental advantages from the various components of the expansion have also been summarised.

Table 1
Summary of Expansion Effects

Component	Existing Refinery	Expanded Refinery
Mine		
Production	Bauxite – 6.5 Mtpa, open pit 1.8 Mtpa is exported	Bauxite – 8 Mtpa, open pit. No change to existing mining and rehabilitation practices. No bauxite is exported.
Refinery		
Production	Alumina – 2.0 Mtpa	Alumina – 3.5 Mtpa
Digestion	Low temperature digestion	High temperature double digestion (all stages). <i>10%improvement in alumina extraction and 25% less residue per tonne of alumina.</i>
Mud Separation	Multi-stage thickeners	Alcan high rate decanters plus conversion of existing thickeners to additional washers.
Evaporation	Multi-stage evaporation plant with seawater cooling.	Additional multi-stage evaporation plant with closed circuit cooling (stage 3 only). <i>No direct seawater/process contact.</i>
Precipitation	Multiple precipitation tanks with two stage cooling and cooling towers	Additional multiple precipitation tanks and cooling tower.
Classification and Filtration	Hydrocyclone classification and vacuum filtration	Additional hydrocyclone classification and vacuum filtration.
Calcining	Rotary calciners (4), stationary calciner (1)	One existing and two stationary bed calciners with rotary calciners on standby (all stages). <i>Less energy consumption and improved dust control.</i>
Impurities Removal	Organic impurities purged to residue disposal area	Liquor purification (all stages). <i>Organic impurities destroyed in purification process with 25% less caustic consumption and 75% reduction in soluble caustic concentration in the residue.</i>
		Alternative Scenario No liquor purification if environmental and health guidelines can not be met during trials. Organic impurities purged to residue disposal area as at present.
Power Station	Three pressure boilers and turbines with fourth to be installed this year	Four existing and one new high pressure boiler and turbine.
Fuel	24 PJ of 3.5% sulfur fuel oil	40 PJ of natural gas (all stages). <i>Minimal sulfur and particulate emissions.</i>
		Alternative Scenario If gas supply delayed, continue with 3.5% sulfur fuel oil until gas available with interim SO ₂ control by fuel switching.
Residue Disposal		
Red Mud Storage	Dry stacking of alkaline red mud in containment dams	Dry stacking of red mud to continue. The current inventory of stored water in the containment dams to be depleted along with the progressive introduction of neutralised red mud. Once the capacity of the existing containment dams is reached (approx 2015), a new containment area will be required. Investigations and separate approvals for new containment dam locations to be sought. <i>Neutralised runoff from containment dams suitable for direct discharge to marine environment to become available progressively.</i>
Red Mud Water Management	Stored in dams with a limited amount neutralised and discharged to the marine environment	Water stored in dams until inventory depleted by expanded neutralisation facility (all stages). Elimination of the long term storage of caustic liquor.

Component	Existing Refinery	Expanded Refinery
Air Emissions		
Combustion	SO ₂ , NO _x , and particulate emissions	SO ₂ and particulates virtually eliminated with gas (all stages). Low NO _x burners (stage 3). Particulates from calciners significantly reduced (all stages). Alternative Scenario SO ₂ and particulates from oil combustion continue for interim period until gas is available. Emissions controlled by fuel switching.
Liquor Purification	No emissions	Emissions from liquor purification plant controlled by scrubber and thermal oxidiser if necessary (all stages) Alternative Scenario No liquor purification if environmental and health guidelines not met during trials.
Water		
Caustic to Ground	Thickener cleaning practices can result in caustic material placed on ground	Existing thickeners converted to red mud washers and new thickeners will minimise placing caustic materials on the ground (all stages). <i>Significantly reduces the potential of caustic seeping to the groundwater from the thickeners.</i>
Marine Discharge	Discharge to Melville Bay of cooling water from the evaporation process, some runoff from the residue disposal area that has been neutralised, stormwater from the refinery and other minor waste streams	Discharge to Melville Bay to continue but cooling water will first be used to neutralise refinery effluent and subsequently red mud before being settled and then discharged. Progressively all of the runoff from the residue disposal area will be neutralised and discharged. Stormwater and other minor waste streams will be a controlled discharge.
Water Supply	Borefield extraction within existing licence conditions for refinery and town	Higher demand to be managed to remain within existing licence limit. Alternative Scenario If modelling indicates the licence limit cannot be met, additional borefield will be identified.
Shipping		
Ship Movements	Export of bauxite, alumina and hydrate. Import of fuel oil, limestone and caustic soda	Bauxite export will cease. Fuel oil imports will cease (apart from occasional delivery of backup supplies). Alumina exports will increase. Gas provided by pipeline. No significant increase in shipping movements except for construction.

2 The Purpose of the EIS

The draft EIS aims to provide:

- a source of information from which individuals and groups may gain an understanding of the proposal, the need for the proposal, the alternatives, the environment that it would affect, the impacts that may occur and the measures taken to minimise those impacts;
- a basis for public consultation and informed comment on the proposal; and
- a framework against which decision-makers can consider the environmental aspects of the proposal, consider whether it is environmentally acceptable, and if so set conditions for approval to ensure environmentally sound development and recommend an environmental management and monitoring program.

The object of these guidelines is to identify those matters that should be addressed in the draft EIS. The guidelines are based on the initial outline of the proposal in the Notice of Intent. Not all matters indicated in the guidelines may be relevant to all aspects of the proposal. Only those matters that are relevant to the proposal should be addressed. The guidelines should, however, not be interpreted as excluding from consideration any matters which are currently unforeseen, which may arise during ongoing scientific studies or which may arise from any changes in the nature of the proposal during the preparation of the draft EIS, the public consultation process and the preparation of the Supplement to the draft EIS (response to submissions).

The draft EIS should be a self-contained and comprehensive document written in a clear, concise style that is easily understood by the general reader. Cross-referencing should be used to avoid unnecessary duplication of text. Text should be supported where appropriate by maps, plans, diagrams or other descriptive material. Detailed technical information and baseline surveys should be included as appendices or working papers.

The justification of the project in the manner proposed should be consistent with the principles of ecologically sustainable development. Assessment of the environmental impacts of the proposal and alternatives should consider the life-cycle impacts, from cradle-to-grave, including sourcing of materials, operational impacts and decommissioning. For the purpose of these Guidelines, the “principles of ecologically sustainable development” are as follows:

- the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- inter- and intra-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;
- conservation of biological diversity and ecological integrity; and
- improved valuation and pricing of environmental resources.